Amendments to the Claims

Please cancel Claims 10 and 24. Please amend Claims 1, 11, 12 and 25-30. Please add new Claims 33-38. The Claim Listing below will replace all prior versions of the claims in the application:

Claim Listing

1. (Currently Amended) A method for displaying a color image comprising the steps of: illuminating a multilevel optical phase element with a light source having a plurality of wavelengths of interest, said multilevel phase element dispersing each wavelength of interest from said light source by diffraction into a plurality of diffraction orders and projecting the dispersed light onto an imaging plane; and actuating a light modulating display in the imaging plane having a plurality of pixel elements, each said pixel element assigned to transmit a predetermined spectral region, positioned within the near field region of said multilevel optical phase element so as to receive said dispersed and projected ~~focused~~ light from said multilevel optical phase element.

2. (Previously Presented) The method of claim 1 wherein said display is positioned at a distance Z from said multilevel optical phase element, wherein Z is determined by the relationship:

$$\frac{2T^2}{3\lambda_{long}} < Z < \frac{2T^2}{3\lambda_{short}}$$

wherein T is the periodicity of said multilevel optical phase element, λ_{Long} is the longest wavelength of said plurality of wavelengths of interest and λ_{Short} is the shortest wavelength of said plurality of wavelengths of interest.

3. (Previously Presented) The method of claim 1 further comprising providing a light source having a polychromatic spectrum.

4. (Previously Presented) The method of claim 1 further comprising providing a plurality of subsources each subsource having a different spectral distribution.

5. (Previously Presented) The method of claim 4 further comprising emitting light from each said subsource with a light emitting diode.

6. (Previously Presented) The method of claim 4 further comprising providing a laser as each said subsource.

7. (Previously Presented) The method of claim 1 further comprising providing a multilevel optical phase element that is multilevel in two orthogonal directions.

8. (Previously Presented) The method of claim 1 wherein said display is positioned at a distance Z from said multilevel optical phase element, wherein Z is determined by the relationship:

$$\frac{T^2}{3\lambda_{long}} < Z < \frac{T^2}{3\lambda_{short}}$$

wherein T is the periodicity of said multilevel optical phase element, λ_{Long} is the longest wavelength of said plurality of wavelengths of interest and λ_{Short} is the shortest wavelength of said plurality of wavelengths of interest.

9. (Cancelled)

10. (Cancelled)

11. (Currently Amended) ~~The method of claim 10 wherein~~ A method for displaying a color image comprising the steps of:

focusing light, from a light source having a plurality of wavelengths of interest, using a plurality of focusing elements, said plurality of focusing elements ~~includes~~

including a plurality of lenslets and wherein said display is positioned at a distance Z from said multilevel optical phase element, wherein Z is determined by the relationship:

$$\frac{2T^2 Z_s}{3\lambda_{long} Z_s - 2T^2} < Z < \frac{2T^2 Z_s}{3\lambda_{short} Z_s - 2T^2}$$

wherein T is the periodicity of said multilevel optical phase element, Z_s is equal to the distance between said multilevel optical phase element and said lenslets minus the focal length of said lenslets[[.]];

illuminating a multilevel optical phase element with light focused by said plurality of focusing elements, said multilevel phase element dispersing each wavelength of interest from said plurality of focusing elements by diffraction into a plurality of diffraction orders and projecting the dispersed light onto an imaging plane; and

actuating a light modulating display in the imaging plane having a plurality of pixel elements, each said pixel element assigned to transmit a predetermined spectral region, so as to receive said dispersed light from said multilevel optical phase element.

12. (Currently Amended) The ~~method of claim 10, wherein~~ A method for displaying a color image comprising the steps of:

focusing light, from a light source having a plurality of wavelengths of interest, using a plurality of focusing elements, said plurality of focusing elements ~~includes~~ including a plurality of lenslets and wherein said display is positioned at a distance Z from said multilevel optical phase element, wherein Z is determined by the relationship:

$$\frac{T^2 Z_s}{3\lambda_{long} Z_s - T^2} < Z < \frac{T^2 Z_s}{3\lambda_{short} Z_s - T^2}$$

wherein T is the periodicity of said multilevel optical phase element, Z_s is equal to the distance between said multilevel optical phase element and said lenslets minus the focal length of said lenslets[[.]];

illuminating a multilevel optical phase element with light focused by said plurality of focusing elements, said multilevel phase element dispersing each wavelength of interest from said plurality of focusing elements by diffraction into a plurality of diffraction orders and projecting the dispersed light onto an imaging plane; and

actuating a light modulating display in the imaging plane having a plurality of pixel elements, each said pixel element assigned to transmit a predetermined spectral region, so as to receive said dispersed light from said multilevel optical phase element.

13. (Previously Presented) The method of claim 11 wherein said multilevel optical phase element is constructed such that a magnification produced by said plurality of lenslets produces a dispersion element of a size substantially equal to the dimensions of each pixel element in said display.

14. (Previously Presented) The method of claim 13 wherein said magnification (M) is given by the equation:

$$M = 1 + \frac{Z}{Z_s}$$

wherein T is the periodicity of said multilevel optical phase element, Z_s is equal to the distance between said multilevel optical phase element and said lenslets minus the focal length of said lenslets and Z is the distance between said multilevel optical phase element and said display.

15. (Previously Presented) A apparatus for displaying a color image comprising:

a light source emitting a plurality of wavelengths of interest;

a multilevel optical phase element positioned to receive light from said light source, said multilevel phase element dispersing each wavelength of interest from said light source by diffraction into a plurality of diffraction orders and projecting the dispersed light onto an imaging plane; and

a light modulating electronic display positioned in the imaging plane and having a plurality of pixel elements, each said pixel element assigned to transmit a predetermined

spectral region, positioned within the near field region of said multilevel optical phase element so as to receive said dispersed light from said multilevel phase element.

16. (Previously Presented) The system of claim 15 wherein said display is positioned at a distance Z from said multilevel optical phase element, wherein Z is determined by the relationship:

$$\frac{2T^2}{3\lambda_{\text{long}}} < Z < \frac{2T^2}{3\lambda_{\text{short}}}$$

wherein T is the periodicity of said multilevel optical phase element, λ_{Long} is the longest wavelength of said plurality of wavelengths of interest and λ_{Short} is the shortest wavelength of said plurality of wavelengths of interest.

17. (Cancelled)

18. (Previously Presented) The apparatus of claim 15 wherein said display is positioned at a distance Z from said multilevel optical phase element, wherein Z is determined by the relation:

$$\frac{T^2}{3\lambda_{\text{long}}} < Z < \frac{T^2}{3\lambda_{\text{short}}}$$

wherein T is the periodicity of said multilevel optical phase element, λ_{Long} is the longest wavelength of said plurality of wavelengths of interest and λ_{Short} is the shortest wavelength of said plurality of wavelengths of interest.

19. (Previously Presented) The apparatus of claim 16 wherein said light source has a polychromatic spectrum.

20. (Previously Presented) The apparatus of claim 15 wherein said light source comprises a plurality of subsources each subsource having a different spectral distribution.

21. (Previously Presented) The apparatus of claim 20 wherein each said subsource is a light emitting diode.

22. (Previously Presented) The apparatus of claim 20 wherein each said subsource is a laser.

23. (Previously Presented) The apparatus of claim 15 wherein said multilevel optical phase element is multilevel in two orthogonal directions.

24. (Cancelled)

25. (Currently Amended) ~~The apparatus of claim 24 wherein~~ <u>An apparatus for displaying a color image comprising:</u>

<u>a light source having a plurality of wavelengths of interest,</u> said plurality of focusing elements ~~comprises~~ <u>including</u> a plurality of lenslets and wherein said display is positioned at a distance Z from said multilevel optical phase element, wherein Z is determined by the relationship:

$$\frac{2T^2Z_s}{3\lambda_{long}Z_s-2T^2} < Z < \frac{2T^2Z_s}{3\lambda_{short}Z_s-2T^2}$$

wherein T is the periodicity of said multilevel optical phase element, Z_s is equal to the distance between said multilevel optical phase element and said lenslets minus the focal length of said lenslets, λ_{long} is the largest wavelength of said plurality of wavelengths of interest and λ_{short} is the shortest wavelength of said plurality of wavelengths of interest[[.]]<u>;</u>

<u>a plurality of focusing elements positioned to focus light from said light source;</u>

<u>a multilevel optical phase element positioned to receive light focused by said plurality of focusing elements, said multilevel phase element dispersing each wavelength of interest from said plurality of focusing elements by diffraction into a plurality of diffraction orders and projecting the dispersed light onto an imaging plane; and</u>

a light modulating electronic display positioned in the imaging plane and having a plurality of pixel elements, each said pixel element assigned to transmit a predetermined spectral region, positioned so as to receive said dispersed light from said multilevel optical phase element.

26. (Currently Amended) ~~The apparatus of claim 24 wherein~~ An apparatus for displaying a color image comprising:

a light source having a plurality of wavelengths of interest, said plurality of focusing elements comprises a plurality of lenslets and wherein said display is positioned at a distance Z from said multilevel optical phase element, wherein Z is determined by the relationship:

$$\frac{T^2 Z_s}{3\lambda_{long} Z_s - T^2} < Z < \frac{T^2 Z_s}{3\lambda_{short} Z_s - T^2}$$

wherein T is the periodicity of said multilevel optical phase element, Z_s is equal to the distance between said multilevel optical phase element and said lenslets minus the focal length of said lenslets, λ_{ong} is the largest wavelength of said plurality of wavelengths of interest and λ_{short} is the shortest wavelength of said plurality of wavelengths of interest[[.]];

a plurality of focusing elements positioned to focus light from said light source;

a multilevel optical phase element positioned to receive light focused by said plurality of focusing elements, said multilevel phase element dispersing each wavelength of interest from said plurality of focusing elements by diffraction into a plurality of diffraction orders and projecting the dispersed light onto an imaging plane; and

a light modulating electronic display positioned in the imaging plane and having a plurality of pixel elements, each said pixel element assigned to transmit a predetermined spectral region, positioned so as to receive said dispersed light from said multilevel optical phase element.

27. (Currently Amended) The apparatus of claim [[24]] 25 wherein said multilevel optical phase element is constructed such that a magnification produced by said plurality of lenslets produces a dispersion element substantially equal to the dimensions of each pixel element in said display.

28. (Currently Amended) The apparatus of claim [[27]] 25 wherein said magnification (M) is given by the equation:

$$M = 1 + \frac{Z}{Z_s}$$

wherein T is the periodicity of said multilevel optical phase element, Z is the distance between said multilevel optical phase element and said display and Z_s is equal to the distance between said multilevel optical phase element and said lenslets minus the focal length of said lenslets.

29. (Currently Amended) The apparatus of claim [[24]] 25 wherein said multilevel optical phase element is multilevel in two orthogonal directions.

30. (Currently Amended) The apparatus of claim [[24]] 25 wherein said light source comprises a plurality of subsources each subsource having a different spectral distribution.

31. (Previously Presented) The apparatus of claim 30 wherein each said subsource is a light emitting diode.

32. (Previously Presented) The apparatus of claim 30 wherein each said subsource is a laser.

33. (New) The apparatus of claim 26 wherein said multilevel optical phase element is constructed such that a magnification produced by said plurality of lenslets produces a

dispersion element substantially equal to the dimensions of each pixel element in said display.

34. (New) The apparatus of claim 33 wherein said magnification (M) is given by the equation:

$$M = 1 + \frac{Z}{Z_S}$$

wherein T is the periodicity of said multilevel optical phase element, Z is the distance between said multilevel optical phase element and said display and Z_s is equal to the distance between said multilevel optical phase element and said lenslets minus the focal length of said lenslets.

35. (New) The apparatus of claim 26 wherein said multilevel optical phase element is multilevel in two orthogonal directions.

36. (New) The apparatus of claim 26 wherein said light source comprises a plurality of subsources each subsource having a different spectral distribution.

37. (New) The apparatus of claim 36 wherein each said subsource is a light emitting diode.

38. (New) The apparatus of claim 36 wherein each said subsource is a laser.